Mitigate risk with Intel's proven track record. Grow your business with innovative platforms. Reduce costs with optimized solutions.

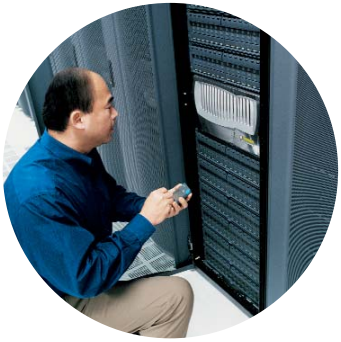
Help lower your Total Cost of Ownership (TCO) with a platform versatile enough to work with single- or dual-core systems and 32-bit or 64-bit applications.

Reduce risk and help your business grow.

The latest generation of 64-bit Intel® Xeon™ processor MP platforms brings an exciting new era of performance, reliability and value for multi-processor servers.

Intel® Xeon™ processor-based systems have long been the platform of choice for the enterprise. In fact, according to IDC[1] they're the most widely used server platform in the world today. And now the sixth generation of Intel® Xeon™ processor MP-based platforms promises even greater productivity and efficiency based on a 10-year proven track record of offering outstanding reliability and performance for processors specifically designed and marketed to the multi-processor server market.

Operating across the broad spectrum of hardware, operating systems and applications, and offering a host of innovations beyond the processor that extend the value and capability of your server platforms, 64-bit Intel Xeon processor MP-based systems help solve the toughest IT challenges. And they're specifically designed to offer you the expandability and headroom you need to make the most of your IT budget—architected for dual-core and 64-bit, yet capable of getting the most from your single-core processors and 32-bit applications.



Move your business forward with Intel's platform innovations.

The power of this new generation of Intel Xeon processor MP-based servers goes beyond the processor itself, to a platform that includes enhanced technologies. In addition, these 4-way platforms give you a choice of multiple speeds spanning different performance levels at entry processor price points comparative to dual-processor systems.

The Intel® E8500 chipset with Intel Xeon processors MP is the first Intel Xeon platform architected for 4-way dual-core processors, delivering an extended lifespan as you make the transition from single-core to multi-core systems. It also supports 64-bit as well as 32-bit applications to further capitalize on your investment.

The chips are based on Intel's 90 nanometer (nm) wafer fabrication process. And they utilize Intel's groundbreaking Hyper-Threading (HT) Technology,[2] which helps increase compute power and throughput by up to 33%[3] to handle larger peak demands and increase your return on investment.

The chipset adds enhanced bandwidth and throughput with dual front-side buses and faster FSB speeds of 667 MHz – a 66% increase over the previous-generation bus speed. It also provides additional memory flexibility with DDR-266, DDR-333 or DDR2-400 and up to 32 DIMMs on 8 branch channels and new memory RAS features and PCI Express* for performance headroom and greater bandwidth efficiency.

All of this adds up to one powerful and versatile option for all your mid-tier computing needs.

Architected for future Intel dual-core processors.

Intel dual- and multi-core products are designed by including two or more full processor cores within a single processor, enabling the simultaneous management of activities. When combined with HT Technology, which allows a processor to present itself as two logical processors, these processors can process four software threads simultaneously by more efficiently using resources that otherwise may sit idle.

This new generation of Intel Xeon processor MP platforms helps businesses get the most productivity from their applications with single-core systems today, and multi-core systems tomorrow.

A cost-effective transition to 64-bit computing.

64-bit Intel Xeon processor MP-based platforms enabled by Intel® Extended Memory 64 Technology[4] (Intel® EM64T) give you the flexibility to prepare for the future in the way that works best for you. Supporting large data sets and both 32- and 64-bit applications, these platforms allow the smooth migration of your business solutions to 64-bit applications at your own pace.

The performance, reliability and flexibility you need.

The new generation of Intel Xeon processor MP-based platforms incorporate a number of other new and enhanced platform technologies that help boost business performance and lower TCO.

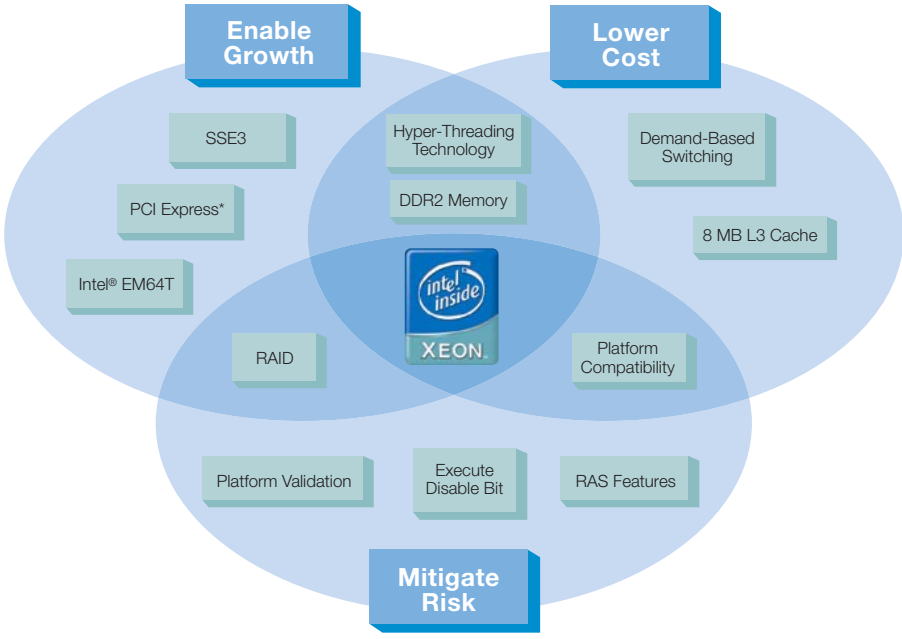
Increase performance with an expanded L3 cache

Experience fast response times with up to 8 MB of L3 cache. Because programs frequently use a subset of instructions or data repeatedly, the larger L3 cache provides higher performance in many server workloads – as much as 62% higher in a CPU-intensive workload, as shown in the server platform performance figure.

Enhance performance for data-intensive applications with PCI Express*

With the increase in the compute performance of the 64-bit Intel Xeon processors MP, the I/O (input/output) rate at which data can be supplied to the processor increases correspondingly. As processors become faster, the rate at which data needs to be supplied increases. In demanding computing situations, users running compute- and I/O-intensive applications may bump up against the maximum usable bandwidth afforded by PCI-X*. Without sufficient memory bandwidth, the processor can sit idle, waiting for data to be transferred, which may affect system performance. At the same time, the industry is transitioning from a parallel I/O (e.g., SCSI, ATA) towards a serial I/O (e.g., SATA, SAS) interconnect infrastructure.

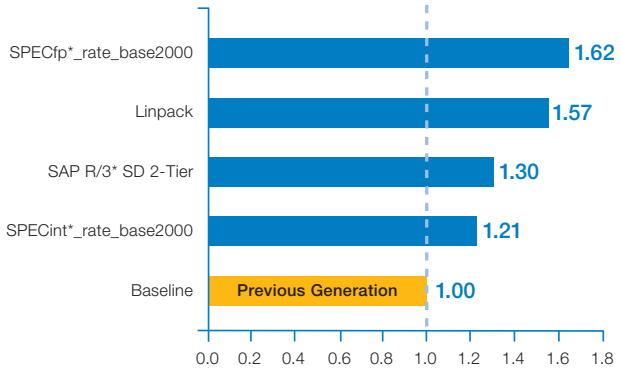
The Platform of Choice Just Got Better



Products and technologies designed and validated together to deliver greater end-user benefits.

64-bit Intel® Xeon™ Processor MP 3.33 GHz with 8 MB L3 Cache
Server Platform Performance

Compares 64-bit Intel® Xeon™ processor MP-based server platforms with its previous generation



Relative Performance – Higher is better

Data Source: All results published/submitted as of March 18, 2005 except Linpack. Linpack result based on Intel internal measurement.

Configuration Details: 64-bit Intel® Xeon™ Processor MP 3.33 GHz with 8 MB L3 Cache – Server Platform Performance

SPECfp*_rate_base2000: Baseline Platform configuration: Dell PowerEdge 6600*, 4xIntel® Xeon™ Processor MP 3.0 GHz with 4 MB L3 Cache, 400 MHz FSB HT Off, Memory: 4 GB (4x1024 MB) DDR200; OS – Build: Microsoft Windows 2000 Advanced Server* (SP2) 32bit; Application: SPEC* CPU2000 benchmark binaries produced with Intel® C/C++ and FORTRAN Compilers version 7.1 (20030402Z) Referenced as published. For more information see http://www.spec.org/cpu2000/results/res2004q1/cpu2000-20040206-02817.html

New Platform configuration: HP ProLiant ML570* G3 with 4xIntel® Xeon™ Processor MP 3.33 GHz with 8 MB L3 Cache, HT ON, Memory: 32 GB memory (16x2 GB DDR2-400); OS – Build: Microsoft Windows Server 2003 Enterprise Edition* Build 3790 (RTM) 32bit; Application: SPEC* CPU2000 benchmark binaries produced with Intel® C/C++ and FORTRAN Compilers version 8.1 (Build 20040802Z) Result submitted to www.spec.org for review as of March 16, 2005

Linpack: Baseline Platform configuration: Intel internal measurement – Feb. 2004; Intel® SRSH4 Server (Shasta), BIOS Version: SSH40.86B.0086.B.0308011746, 4x3.0 GHz Intel® Xeon™ processors MP with 4 MB L3 cache (stepping R0); Hyper-Threading disabled, Hardware prefetch enabled, Adjacent Sector prefetch enabled, 100 MHz (400 MT/s) Bus, Chipset: ServerWorks Grand Champion* HE; 8 GB memory (8x1 GB DDR266 installed from DIMM1to DIMM8); Red Hat Linux EL3.0* kernel 2.4.21-4.ELcustom #2 SMP with 4 GB kernel-space and 4 GB user-space virtual memory support enabled; MKL LINPACK Version 2.0.2c binary

New Platform configuration: Intel internal measurement – Feb. 2005; Intel® SR6850HW4 (Harwich SDP) 4xIntel® Xeon™ Processor MP 3.33 GHz 8 MB L3 cache, Intel® E8500 chipset (Twincastle), Dual Independent Busses at 667 MHz, 10.67 GB/sec theoretical bandwidth; Memory: 16x1 GB DDR2-400 BIOS: SHW40.86B.B10.01.00.0031; Hardware Pre-fetch: Default state (enabled), Adjacent Cache Line Pre-fetch: Default state (enabled), HT disabled OS – Red Hat Enterprise Linux* AS release 3 (Taroon Update 3) 2.4.21-20.EL x86_64 GNU/Linux Workload: 5Kx5K through 44Kx44K matrix sizes used; 44Kx44K matrix allocates 15.5 GB Workload Type: Scalar

SAP R/3* SD 2-tier: Baseline Platform configuration: IBM eServer xSeries* x365 server platform with 4xIntel® Xeon™ processor MP 3.0 GHz with 4 MB L3 Cache, 8 GB Memory, Microsoft Windows Server 2003 Enterprise Edition* (32-bit), IBM DB2* UDB 8.1 (32-bit), SAP SD standard R/3 Enterprise* 4.70 (32-bit) application benchmark. Referenced as published at 720 users. Results at http://www50.sap.com/benchmark/pdf/cert1904.pdf

New Platform configuration: HP ProLiant* DL580 G3, 4-way SMP, 64-bit Intel® Xeon™ Processor MP 3.33 GHz with 8 MB L3 cache, 32 GB main Microsoft Windows Server 2003 Enterprise Edition* (64-bit), SQL Server 2000* (32-bit), SAP SD standard R/3 Enterprise* 4.70 (64-bit) application benchmark. Referenced as published at 937 users. Results at http://www50.sap.com/benchmark/

SPECint*_rate_base2000: Baseline Platform configuration: ION Computer Systems, BX41 4xIntel® Xeon™ Processor MP 3.0 GHz with 4 MB L3 Cache and 400 MHz system bus, HT OFF, 2 GB, DDR266 memory, Red Hat Enterprise Linux ES* release 3, Intel® C++ Compiler for Linux 8.0 (Build 20040412Z), MicroQuill SmartHeap* Library 7.1. Result published at http://www.spec.org/cpu2000/results/res2004q2/cpu2000-20040514-03026.html

New Platform configuration: HP ProLiant ML570* G3 with 4xIntel® Xeon™ Processor MP 3.33 GHz with 8 MB L3 Cache, HT ON, Memory: 32 GB memory (16x2 GB DDR2-400); OS – Build: Microsoft Windows Server 2003 Enterprise Edition* Build 3790 (RTM) 32bit; Application: SPEC* CPU2000 benchmark binaries produced with Intel® C/C++ and FORTRAN Compilers version 8.1 (Build 20040802Z). Result submitted to www.spec.org for review as of March 16, 2005

A new serial I/O technology foundation is required to match the performance and capabilities of these next-generation serial interconnects. PCI Express* is an answer to both of these issues.

PCI Express is architected to have lower memory and I/O latency compared to PCI*. PCI Express is also capable of higher bandwidth compared to today's PCI or PCI-X solutions. Higher bandwidth means more data can be transferred in the same unit of time. A PCI Express x1 ("by 1") link has a bi-directional peak bandwidth of 500 MB/s, while x4 and x8 links are capable of 2 GB/s and 4 GB/s, respectively. The lower latency and the increased bandwidth help deliver the data speed required to fully utilize the processor's capabilities.

Current legacy PCI-X adapters can still be used while transitioning to new I/O adapters that take advantage of the inherent benefits of this new serial I/O technology.

With the Intel E8500 chipset, PCI Express adapters have a direct path to the chipset's memory controller instead of having to go through a separate bridge component. With the direct attach to the memory controller, one stage is removed. This implementation helps minimize the latency between the I/O adapter and the memory controller, helping to improve I/O performance.

In addition to the many benefits of PCI Express, it is also a common I/O interface for mobile, desktop, workstation, storage, and network technologies. This results in economies of scale, which in turn should drive down the cost of PCI Express solutions.

And as the industry transitions from a parallel to a serial I/O infrastructure, users can confidently invest in new MP server platforms supporting PCI Express technology. With their scalable architecture, these platforms provide a smooth upgrade path to 10 Gigabit-based technologies.

Help save on power costs using Demand-Based Switching (DBS) with Enhanced Intel SpeedStep® technology

Enhanced Intel SpeedStep® technology, a feature of 64-bit Intel Xeon processors MP, enables platform and software power management features to help lower average power consumption while maintaining application performance. During preliminary internal testing on Intel development platforms using enhanced

Platform Feature	User Benefit
Up to 8 MB integrated L3 cache	• More data can be stored closer to processor execution units for faster data access, resulting in higher system throughput and shorter system latency than previous generation
Intel® Extended Memory 64 Technology	• Enables extended memory addressability for server applications
Demand-Based Switching (DBS) with Enhanced Intel SpeedStep® technology	• Enables platform and software power management features to help lower average power consumption while maintaining application performance and improving acoustics
PCI Express* serial I/O	• Next-generation I/O capable of up to 8 GB/s peak bandwidth • Improved RAS features compared to PCI-X* • Lower latency compared to PCI-X for improved I/O performance • Software compatible with PCI-X to simplify parallel-to-serial transition
DDR2-400 memory	• Provides up to 20% increase in memory bandwidth over DDR-333 • 30 to 40% lower power consumption vs. DDR-333 on systems tested[5] • Increased DIMMs per system for enhanced memory scalability
Enhanced reliability and manageability	• Many memory controller features, together with PCI Express RAS features combine to help improve platform reliability vs. previous-generation platforms • New features include Error Correcting Code (ECC) system bus, new memory RAID, and I/O and memory hot-plug • The Intel® E8500 chipset includes an SMBus port for remote management operation and support for a variety of third-party BMC (base management controller) and BIOS solutions
Streaming SIMD Extensions 3 (SSE3) instructions	• Improved multimedia and encryption/decryption processing than previous generation, along with support for more computationally intensive graphics
Hyper-Threading Technology	• Improved processor utilization and system responsiveness in conjunction with the new Streaming SIMD Extensions 3 instructions than with SSE2 alone
High-speed 3-load front-side system bus (667 MHz)	• 10.6 GB/s—over three times faster than previous Intel® Xeon™ processor MP-based platforms with 400 MHz system bus
PIROM and thermal sensor	• Allows for scheduled service in the event of a system manufacturing defect or cooling device failure

Intel SpeedStep technology, the average processor power consumption was reduced by up to 25% on systems tested, with minimal performance impact.[6]

The processor's operational states can vary based on usage. So when utilization is high and maximum performance is desired, the processor can be switched to a higher operational state automatically. When usage is lower, transitioning to a lower operational state helps lower the average power consumption while maintaining application performance. There is even a state for maximum power conservation during system idle periods. Not only are power-consumption levels reduced during lower operational states, but system acoustics can also be lowered by slowing down or halting fan operation entirely.

Help improve security and reduce virus-related repairs with Intel® Execute Disable Bit functionality

Malicious buffer overflow attacks pose a significant security threat to your business, increasing your IT resource demands and in some cases destroying data. In a typical attack, a malicious worm creates a flood of code that overwhelms the processor, allowing the worm to propagate itself to the network and other computers. Intel® Execute Disable Bit functionality can help prevent certain classes of malicious "buffer overflow" attacks when combined with a supporting operating system.

Intel Execute Disable Bit allows the processor to classify areas in memory by where the application code can execute and where it cannot. When a known malicious worm within certain classes of attacks attempts to insert code in the buffer, Intel Execute Disable Bit enables the processor to disable code execution, helping to prevent damage or worm propagation.

Intel Execute Disable Bit currently requires one of the following operating systems:

- Microsoft Windows Server 2003* with Service Pack 1
- Microsoft Windows XP* with Service Pack 2
- SUSE Linux* 9.2
- Red Hat Enterprise Linux 3* Update 3

See the Microsoft Windows Service Pack Roadmap for more information on future Service Pack releases.

Multitask more effectively with Hyper-Threading Technology

Hyper-Threading (HT) Technology is a groundbreaking technology that boosts computing performance to help keep pace with today's applications and operating systems. HT Technology enables a single processor to function as two "virtual" processors by executing two threads in parallel, allowing you and your software to multitask more effectively than ever before.

Increase responsiveness with Streaming SIMD Extensions 3 (SSE3) instructions

Thirteen new SSE3 instructions are fully supported by the 64-bit Intel Xeon processor MP. Two of these new instructions can help improve thread synchronization over the previous-generation processor supporting SSE2 technology, helping to increase processor utilization, enhance Hyper-Threading performance and increase system responsiveness.

Increase bandwidth and lower power consumption with DDR2-400 memory

With the increase in processor bandwidth, it's important to have faster, dual-channel memory designs that can keep pace. DDR2-400 memory provides better memory bandwidth and reduced latency compared to older DDR-333 memory designs, and the power generated is lower by up to 40%[5] on systems tested, which helps reduce the overall system power requirements.

Enterprise servers that require large memory configurations (such as those employing Intel EM64T) also benefit as the total power generated is reduced in comparison with DDR technology.

Help reduce your IT help desk costs with enhanced reliability and system management.

As you know, system hardware is only a small fraction of the TCO. One way to reduce TCO is by improving system manageability. Incorporating the best thinking from the broadest base of industry hardware, software and integration leaders, Intel's world-class server solutions help you lower your TCO. Currently, with over $500 million in annual ISV investments and over 170,000 registered solution developers in the Intel community, you can be sure that Intel processor-based servers have one of the widest software application compatibility.

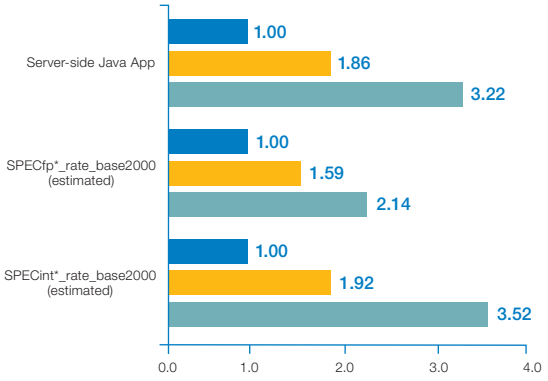
In fact Intel processor-based servers currently support more than 20 operating systems and thousands of applications, validated and optimized for high-availability, performance and reliability. Also take advantage of built-in advanced security features to help improve uptime and avoid unplanned costs. How do you extend the value of your server investments? With solutions offered today from over 20,000 vendors worldwide, you can adopt a flexible approach to growth and change with stable and long-lasting solutions built on Intel platforms.

64-bit Intel® Xeon™ Processor MP 3.33 GHz with 8 MB L3 Cache

Scalability – 1P to 4P Scaling Comparison with Previous Generation

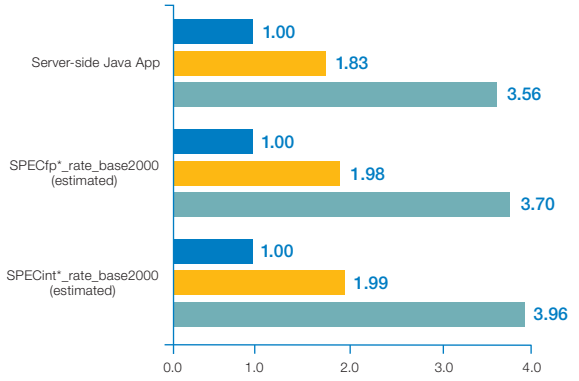
Compares 1P to 4P scalability of 64-bit Intel® Xeon™ processor MP 3.33 GHz with 8 MB L3 Cache platform with its previous generation

Previous-Generation Platform – 1P to 4P Scaling



Data Source: Intel internal measurement (February 2005).

Current-Generation Platform – 1P to 4P Scaling



Data Source: Intel internal measurement (February 2005).

- **Intel® Xeon™ processor MP 3.0 GHz, 4 MB L3 Cache (1P)**
- **Intel® Xeon™ processor MP 3.0 GHz, 4 MB L3 Cache (2P)**
- **Intel® Xeon™ processor MP 3.0 GHz, 4 MB L3 Cache (4P)**

- **64-bit Intel® Xeon™ processor MP 3.33 GHz, 8 MB L3 Cache (1P)**
- **64-bit Intel® Xeon™ processor MP 3.33 GHz, 8 MB L3 Cache (2P)**
- **64-bit Intel® Xeon™ processor MP 3.33 GHz, 8 MB L3 Cache (4P)**

Configuration Details
64-bit Intel® Xeon™ Processor MP 3.33 GHz with 8 MB L3 Cache
Scalability – 1P to 4P Scaling Comparison with Previous Generation

SPECfp*_rate_base2000, SPECint*_rate_base2000: Performance estimates based on Intel internal measurement. For details see www.spec.org/cpu2000: Previous-generation platform configuration: Intel internal measurement – February 2005: Intel® SRSH4 Server System (Shasta) BIOS: SSH4 BIOS Release 14.0, 1, 2, and 4P configuration with Intel® Xeon™ Processor MP 3.0 GHz with 4 MB L3 Cache (Gallatin), (CPUID F26, Revision E), 4x100 MHz FSB HT ON, Memory: 3 GB (12x256 MB DDR 266) fully populated; OS – Build: Microsoft Windows Server 2003 Enterprise Edition* Build 3790 (RTM) 32bit; Application: SPEC* CPU2000 benchmark version 1.2 precompiled "official" binaries produced with Intel® C/C++ and FORTRAN Compilers version 8.1 (Build 20040802Z)

Current-generation platform configuration: Intel internal measurement – February 2005: Intel® Harwich Beta Server System, BIOS: SHW40 BIOS Version 1.00, Beta BIOS 01 Build 24, 1, 2, and 4P configuration with Intel® Xeon™ Processor MP 3.33 GHz with 8 MB L3 Cache, B0 Stepping, 4x166 MHz FSB HT ON, Memory: 16 GB (16x1 GB DDR2-400) fully populated; OS – Build: Microsoft Windows Server 2003 Enterprise Edition* Build 3790 (RTM) 32bit; Application: SPEC* CPU2000 benchmark version 1.2 precompiled "official" binaries produced with Intel® C/C++ and FORTRAN Compilers version 8.1 (Build 20040802Z)

Server-Side Java App – This workload evaluates the performance of Server-side Java Application. Measured in operations per second. Performance estimates based on Intel internal measurement: Previous-generation platform configuration: Intel internal measurement – September 2004; Intel® Server Platform SRSH4 (Shasta) Serverworks Grand Champion* HE chipset; BIOS Version: SSH40.86B.0086.B.03080011746; AS prefetch enabled, HW prefetch disabled; 1, 2, and 4P configuration with Intel® Xeon™ processor MP 3.0 GHz 4 MB L3, HT enabled; Memory: 4 GB memory (4x1 GB DDR 266 installed from DIMM#1 to DIMM#4) Intel® PRO/1000 XT Server Adapter (1 GB) Red Hat Linux* EL3.0 (Kernel 2.4.21-4.ELsmp) BEA WebLogic* JRockit* 1.4.2_04 JVM Load16

Current-generation platform configuration: Intel internal measurement – February 2005; S3E3100 Server System, "Harwich" Platform, 1, 2, and 4P configuration with Intel® Xeon™ Processor MP 3.33 GHz 8 MB L3 Cache, C0 Stepping, BIOS: SHW40.86B.B01.01.0024, Prefetch settings: (default), Hardware prefetch enabled, Adjacent sector prefetch enabled, Memory: 8 GB (8x1 GB DDR2-400 DIMMs), Microsoft Windows Server 2003 Enterprise Edition* RTM, BEA WebLogic* JRockit* 1.5.0 JVM build dra-38972-20041208-2001-win-ia32 (from BEA website)

Manage software across heterogeneous systems

The Intelligent Platform Management Initiative (IPMI) is an open hardware-management interface that uses a standardized message-passing interface. IPMI helps enable management software interoperability in a heterogeneous hardware environment.

The Intel E8500 chipset includes an SMBus port that supports multiple third-party base management controller (BMC) and firmware solutions. Support for multiple third-party solutions not only provides flexibility and customer choice, it also represents a significant advancement in management software interoperability, greatly simplifying system management.

IPMI helps enable management software that works across heterogeneous server system hardware via:

- Instrumentation in server motherboard hardware
- Standards-based architecture for systems and asset management
- Interoperability between hardware and software management
- Reliability through a hierarchy of sensors that report alerts to remote consoles
- Common architecture that applies to the 3-tier server architecture prevalent in modern datacenters
- Helping to reduce TCO and administration with the use of common software user interfaces across multiple servers from multiple vendors

Help reduce downtime with enhanced memory protection

With the rapid price decline of memory, there has been an increase in the amount of memory usage in systems. With more memory in use, the potential for memory failure increases, which increases the importance of memory reliability features in the platform. New Intel Xeon processor MP-based server platforms offer increased reliability over previous platforms through features implemented in the chipset memory controller:

- **Error Correcting Code (ECC) –** The system detects single- and double-bit errors and automatically corrects single-bit errors on internal data paths.
- **New! Memory RAID –** Similar to RAID for disks, Memory RAID uses partitions of the system memory as independent, redundant data stores to help enable reconstruction of the system data even in the event of a memory board failure.
- **New! Demand and patrol scrubbing –** The system proactively searches the system memory, repairing correctable errors or permanently marking the memory location as unreadable.
- **SMBus with PIROM and thermal sensor –** This feature allows for scheduled service in the event of a system manufacturing defect or cooling device failure, going to a lower power state if a critical temperature is reached.
- **Memory mirroring –** Splits the memory subsystem into two and duplicates the data in each half. The redundant memory image is used as a check against errors in the memory.
- **Hot-plug I/O and memory –** Add memory or I/O after installation without service interruption.
- **DIMM sparing –** Swaps "defective" DIMMs with installed but otherwise unused DIMMs.
- **X8 single device data correction (X8 SDDC) –** Allows you to fix the failure of an entire DRAM device on-the-fly by removing a single DRAM from the memory map and recovering its data into a new device.

PCI Express Reliability/Availability/Serviceability (RAS) features help keep you up and running

PCI Express is rich in RAS capabilities:

- Built-in clocking for Data Integrity Checking
- Advanced error logging and reporting through IPMI
- Hot-plug capability simplifies replacement of failed devices and helps reduce system downtime, while allowing mix and match of peripherals and systems or I/O chassis from different vendors (something that is not generally possible in today's environment)
- A high-performance yet cost-effective RAID can be implemented on the server board using the Intel® IOP332 I/O processor, designed to connect directly to the chipset's memory controller via PCI Express

Summary

Multi-processor server platforms based on the 64-bit Intel Xeon processor MP and the Intel E8500 chipset deliver outstanding computing power and flexibility, with the cost-effectiveness you need today and the headroom you need to migrate to dual core and 64 bit in the future.

In addition, these new platforms, backed by the Intel Xeon processor, offer optimized power consumption plus improved platform reliability features and manageability compared to previous-generation server platforms to further help lower TCO and maximize your return on investment.

There are compelling reasons to move your business to 64-bit computing now. The 64-bit Intel® Xeon™ processor MP with 8 MB L3 cache gives you memory flexibility, application headroom, I/O headroom, improved reliability, lower power consumption, and increased security.

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[1] Based on IDC Worldwide Quarterly Server Tracker, Q404, issued on February 25, 2005

[2] Hyper-Threading Technology requires a computer system with an Intel® Pentium® 4 processor supporting Hyper-Threading Technology and an HT Technology-enabled chipset, BIOS and operating system. Performance will vary depending on the specific hardware and software you use. See http://www.intel.com/info/hyperthreading/ for more information including details on which processors support HT Technology.

[3] Source:http://www.intel.com/technology/computing/htt/index.htm

[4] Source:Intel® EM64T requires a computer system with a processor, chipset, BIOS, OS, device drivers and applications enabled for Intel EM64T. Processor will not operate (including 32-bit operation) without an Intel EM64T-enabled BIOS. Performance will vary depending on your hardware and software configurations. Intel EM64T-enabled OS, BIOS, device drivers and applications may not be available. Check with your vendor for more information.

[5] Source: http://www.elecdesign.com/Articles/Index.cfm?ArticleID=3189&pg=3

[6] http://www.intel.com/business/bss/infrastructure/enterprise/power_thermal.pdf>

For more information on 64-bit Intel® Xeon™ processor MP-based platforms please go to: www.intel.com/business/bss/products/server/xeon_mp/index.htm

Performance tests and ratings are measured using specific computer systems and/or components and reflect the approximate performance of Intel products as measured by those tests. Any difference in system hardware or software design or configuration may affect actual performance. Buyers should consult other sources of information to evaluate the performance of systems or components they are considering purchasing. For more information on performance tests and on the performance of Intel products, visit http://www.intel.com/performance/resources/limits.htm or call (U.S.) 1-800-628-8686 or 1-916-356-3104.

All dates and products specified are for planning purposes only and are subject to change without notice

Relative performance for each benchmark is calculated by taking the actual benchmark result for the first platform tested and assigning it a value of 1.0 as a baseline. Relative performance for the remaining platforms tested was calculated by dividing the actual benchmark result for the baseline platform into each of the specific benchmark results of each of the other platforms and assigning them a relative performance number that correlates with the performance improvements reported.

64-bit Intel® Xeon™ processors with Intel® EM64T requires a computer system with a processor, chipset, BIOS, OS, device drivers and applications enabled for Intel EM64T. Processor will not operate (including 32-bit operation) without an Intel EM64T-enabled BIOS. Performance will vary depending on your hardware and software configurations. Intel EM64T-enabled OS, BIOS, device drivers and applications may not be available. Check with your vendor for more information.

SPECint2000 and SPECfp2000 benchmark tests reflect the performance of the microprocessor, memory architecture and compiler of a computer system on compute-intensive, 32-bit applications. SPEC benchmark tests results for Intel microprocessors are determined using particular, well-configured systems. These results may or may not reflect the relative performance of Intel microprocessor in systems with different hardware or software designs or configurations (including compilers). Buyers should consult other sources of information, including system benchmarks; to evaluate the performance of systems they are considering purchasing.

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